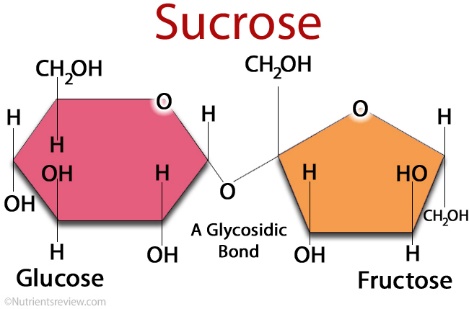
Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**Yeast Respiration Lab Graph, Discussion, and Conclusion Assignment**

Pre-AP Biology, Mrs. Krouse

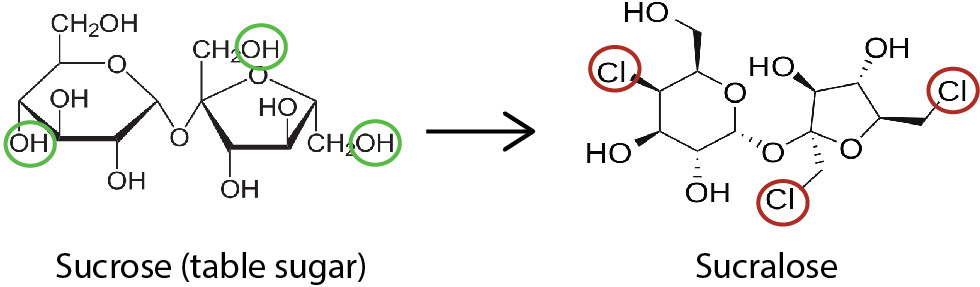
**Background Information:** Let’s suppose you were measuring the respiration rate in yeast cells when they were provided with three different sources of energy—sucrose, glucose, and Splenda (an artificial sweetener).

As we learned in our yeast respiration lab before winter break, table sugar’s “chemical name” is sucrose, which is a disaccharide. Yeast can break down sucrose into two monosaccharides (glucose and fructose) using an enzyme called sucrase. This reaction in which sucrose is broken down by sucrase occurs fairly quickly within yeast cells but not instantaneously. Glucose can be directly used during cellular respiration in yeast cells. (Remember, glucose is one of the major reactants for cellular respiration!). Fructose can be used in yeast cellular respiration as well, but this involves a more time-consuming series of reactions. The image below shows sucrose with its two parts (glucose and fructose) connected with a special type of covalent bond that is only found in carbohydrates called a glycosidic bond.





Splenda is an artificial sweetener that contains sucralose as its primary ingredient. Sucralose has the same basic structure as sucrose, but it contains three chlorine atoms where in locations where sucrose contains hydroxyl groups (see image below). (Hydroxyl groups contain an oxygen atom and a hydrogen atom.) Because of these changes to sucrose’s structure, it cannot be broken down and used for energy by yeast or humans. Splenda also contains maltodextrin, a large carbohydrate chain (i.e., polysaccharide) consisting of multiple glucose molecules bonded together. Yeast cells lack the enzymes necessary to break maltodextrin down into individual glucose units to use for fuel. Splenda’s final ingredient is “dextrose.” Dextrose is another name for glucose.



During the experiment, you placed equal amounts of yeast in three different flasks with equal amounts of water. You provided the yeast cells in Flask #1 with 10 grams of sucrose. You provided the yeast cells in Flask #2 with 10 grams of glucose. You provided the yeast cells in Flask #3 with Splenda. You then placed a balloon over the top of each flask to collect any carbon dioxide gas produced by the yeast cells during cellular respiration.

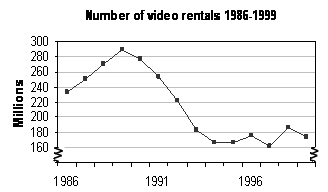
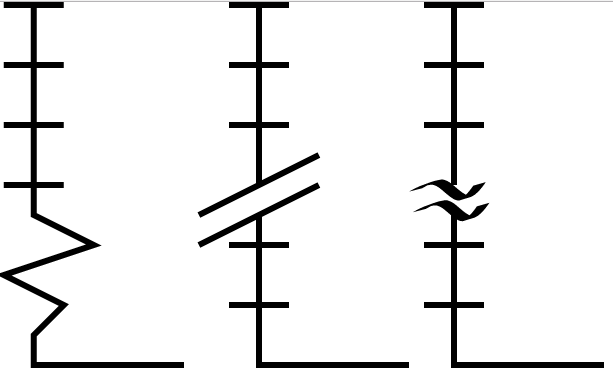
Next, you “activated” the yeast cells in each of the flasks by placing them in a warm water bath for 2 minutes. After this, you measured the circumference of each balloon every two minutes for 20 minutes. You recorded your measurements in the chart below.

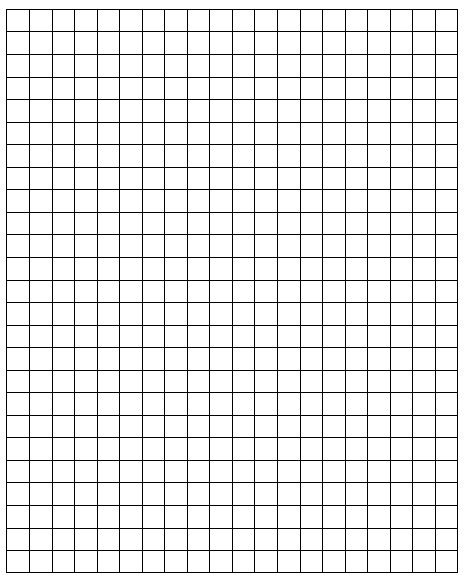
|  |  |  |  |
| --- | --- | --- | --- |
| **Time** (in minutes) | **Circumference of the Balloon** (in cm) | | |
| **Flask #1: Sucrose Trial** | **Flask #2: Glucose Trial** | **Flask #3: Splenda Trial** |
| 0 | 10 cm | 10 | 10 cm |
| 2 | 11 cm | 16 | 15 |
| 4 | 14 cm | 20 | 19 |
| 6 | 16 cm | 25 | 20 |
| 8 | 18 cm | 29 | 20 |
| 10 | 20 cm | 30 | 20 |
| 14 | 23 cm | 30 | 20 |
| 16 | 26 cm | 30 | 20 |
| 18 | 29 cm | 30 | 20 |
| 20 | 30 cm | 30 | 20 |

**Graph:** Using the grid on the next page, graph the three data sets. Before graphing the data, answer the following questions in your groups. I will be calling on individual students to answer the questions with my popsicle sticks, so make sure to use your group time effectively!

1. What is the independent variable in the experiment?
2. What is the dependent variable in the experiment?
3. What type of graph will you use (line or bar) and why?
4. What will you put on the X-axis?
5. What will you put on the Y-axis?
6. What information will you include in your key?
7. What will your title be? (Remember: Your title should include information about what’s on both of your axes as well as information from your key. Sometimes, titles of scientific graphs take the format “The Effect of \_\_\_\_\_ on \_\_\_\_\_.”

Now you are ready to create your graph on the grid below. Remember to include a title, axis labels with units in parentheses, a key, and properly plotted data for the three data sets. Additionally, remember to include proper scales for your axes so that your data is spread across the grid, not clumped in one portion of the grid. If necessary, you can create a break in an axis if you need to “jump up” from one value to another to spread your data across the grid. Typically, these breaks are seen between zero and your first data point, but they can be anywhere on your axis. The symbols shown below (left) can be used to indicate a break in your axis. An example of a graph with actual data that includes a break in the y axis is shown below (right) as well.





**Discussion / Conclusion:** At the bottom of this page, write a discussion / conclusion section that includes the following elements. Please break your discussion / conclusion section down into four numbered parts that correspond to the four required elements described below. If you need to continue onto a second piece of paper due to lack of space, please do so.

1. Describe the main difference between the data from Flask #1 and Flask #2. Your description must be clear (i.e. easy to understand) and accurate (i.e., correct). You must include relevant numerical data to support your assertion.

**/3 points**

1. Explain why this difference occurred using information from the “Background Information” section at the beginning of this assignment. Your explanation must be clear, accurate, and thorough (i.e., detailed).

**/3 points**

1. Describe the main difference between the data from Flask #2 and Flask #3. Your description must be clear and accurate. You must include relevant numerical data to support your assertion.

**/3 points**

1. Explain why this difference occurred using information from the “Background Information” section. Your explanation must be clear, accurate, and thorough.

/**3 points**

**Total: \_\_\_\_\_/12 points**